

What is claimed is:

1. A method for cleaning an electron beam treatment apparatus that comprises:

generating an electron beam that energizes a cleaning gas in a chamber of the electron beam treatment apparatus;

monitoring an electron beam current;

adjusting a pressure of the cleaning gas to maintain the electron beam current at a substantially constant value; and

stopping when a predetermined condition has been reached.

2. The method of claim 1 wherein the predetermined condition is that the cleaning gas pressure becomes substantially constant for a predetermined length of time.

3. The method of claim 1 wherein the predetermined condition is that a predetermined length of time has elapsed.

4. The method of claim 1 wherein the cleaning gas comprises an oxygen-based gas.

5. The method of claim 4 wherein the oxygen-based gas comprises one or more of O<sub>2</sub>, ozone, NO, and H<sub>2</sub>O.

6. The method of claim 1 wherein the cleaning gas comprises a fluorine-based gas.

7. The method of claim 6 wherein the fluorine-based gas comprises one or more of NF<sub>3</sub>, F<sub>2</sub>, CF<sub>4</sub>, C<sub>2</sub>F<sub>6</sub>, C<sub>3</sub>F<sub>8</sub>, SF<sub>6</sub>.

8. A method for cleaning an electron beam treatment chamber that comprises:

generating an electron beam that energizes a cleaning gas in a chamber of the electron beam treatment apparatus; and

stopping after a predetermined length of time has elapsed.

9. The method of claim 8 wherein the cleaning gas comprises an oxygen-based gas.

10. The method of claim 9 wherein the oxygen-based gas comprises one or more of O<sub>2</sub>, ozone, NO, and H<sub>2</sub>O.

11. The method of claim 8 wherein the cleaning gas comprises a fluorine-based gas.

5 12. The method of claim 11 wherein the fluorine-based gas comprises one or more of NF<sub>3</sub>, F<sub>2</sub>, CF<sub>4</sub>, C<sub>2</sub>F<sub>6</sub>, C<sub>3</sub>F<sub>8</sub>, SF<sub>6</sub>.

13. The method of claim 8 wherein a gas pressure of about 1 Torr or greater is maintained in the chamber.

10 14. The method of claim 9 wherein a gas pressure of about 1 Torr or greater is maintained in the chamber.

15. The method of claim 11 wherein a gas pressure of about 1 Torr or greater is maintained in the chamber.